



## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

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<p>(21) International Application Number: PCT/GB85/00248</p> <p>(22) International Filing Date: 7 June 1985 (07.06.85)</p> <p>(31) Priority Application Number: 8414596</p> <p>(32) Priority Date: 8 June 1984 (08.06.84)</p> <p>(33) Priority Country: GB</p> <p>(71) Applicant (<i>for all designated States except US</i>): CRESTOL LIMITED [GB/GB]; Crestol House, Sowerby Bridge, W Yorkshire (GB).</p> <p>(72) Inventor; and</p> <p>(75) Inventor/Applicant (<i>for US only</i>) : PURI, Aran, Kumar [GB/GB]; 'Tushar II', 37 Springwood Drive, Lower Skircoat Green, Halifax, W Yorkshire HX3 OTQ (GB).</p>		<p>(81) Designated States: BE (European patent), CH (European patent), DE (European patent), FI, FR (European patent), GB (European patent), IT (European patent), NL (European patent), SE (European patent), US.</p> <p><b>Published</b>  <i>With international search report.  Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments.</i></p>	
<p>(54) Title: TREATMENT OF HAIR, SKIN AND NAILS</p> <p>(57) Abstract</p> <p>The condition of the hair, skin and nails is improved by treatment with a reducing composition, rinsing of the treated part, contact of the rinsed part with an aqueous protein hydrolysate and then contact with a neutralising composition. When the treatment is applied to the hair as a cold waving or permanent cold waving, the treated hair has a greatly improved condition, with a better and more natural feel when both wet and dry a good shine.</p>			

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TREATMENT OF HAIR, SKIN AND NAILS

Field of the Invention

This invention relates to the treatment of hair, skin and nails so that they acquire an improved condition.

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Disclosure of the Invention

For hair the present treatment is incorporated in the cold waving or permanent waving procedures of the well known types. These procedures usually involve contact of  
10 the hair with a reducing agent to cleave the disulphide bonds of the hair keratin, so that the hair can be reshaped. After this contact, the hair is rinsed, reshaped and treated with a neutralising agent. This last treatment causes re-formation of disulphide linkages.

15 It is well known that hair is damaged in such processes and many chemical modifications of the processes have been proposed and tried, with varying degrees of success.

We have now developed a process in which the treated  
20 hair has a greatly improved condition, with a better and more natural feel when both wet and dry and a good shine. Surprisingly it was found that the improved condition persists through a number of subsequent shampoo treatments. When the treatment is applied to  
25 skin and nails, there is also a beneficial conditioning

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effect.

According to the present invention there is provided a process for improving the condition of the hair, skin or nails, characterised by contact of that body part with a reducing composition, rinsing of the treated part, contact of the rinsed part with an aqueous protein hydrolysate and then contact with a neutralising composition.

Preferably the aqueous protein hydrolysate is obtained by using a protein having a large number of disulphide linkages, especially a protein containing at least 1% of cysteine. A particularly effective hydrolysate may be obtained by hydrolysis of keratin with aqueous sodium hydroxide under mild conditions.

The hydrolysed protein preferably has an average molecular weight of 2,000 to 200,000 daltons and especially over 50,000 daltons. The aqueous protein hydrolysate is preferably at pH 5 to 8 for use, and after it has been prepared the pH may be adjusted if necessary. Any desirable additive may be incorporated in the hydrolysate, for example a cationic polymer product of the type used in hair treatment preparations, and a perfume. A particularly suitable cationic polymer is the commercial product "Merquat"-100 ( Registered Trade Mark ), and the condition of the hair, skin and nails may be even

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further improved when it is used.

The reducing composition may contain any of the known types of reducing agents known for softening of the hair by cleavage of disulphide bonds in the hair  
5 keratin. These agents include thioglycollic or thiolactic acid or their salts, or an alkali metal or ammonium sulphite or bisulphite, or thioglycerol. With thioglycollic acid the composition preferably contains 2 to 20% by weight. The composition is suitably an aqueous solution, and adjuvants such as surfactants,  
10 etc. may also be included.

The neutralising composition may contain an oxidising agent such as hydrogen peroxide or sodium bromate. Hydrogen peroxide may be at pH 3 to 4 to ensure  
15 that hair swelling is reduced, with restoration of keratin linkages. Again any desired materials may be included in the composition, for example surfactants and perfumes.

In the waving of hair, preferably the hair is first given a shampoo. The hair is then wound on rods in the usual way and the reducing composition is applied.  
20 Alternatively the composition may be applied to the hair before it is wound on the rods. The hair is then rinsed, for example with water, and the aqueous  
25 protein hydrolysate is applied. Finally the

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neutralising composition is applied. The hair may then be washed, suitably before removal of the rods.

A similar procedure is used with the skin and nails.

Compositions of the type used with the hair may be 5 applied, and these compositions may be modified if desired. For example thickening or gelling agents may be included to give compositions that are retained on a particular area after application.

The invention also includes a kit for use in a 10 process as defined above, the kit containing a reducing composition, an aqueous protein hydrolysate and a neutralising composition each in separate bottles.

The following Examples illustrate the invention.

15                   Example 1

In the hair clinic, tests were made with the hair of a number of subjects. For each a shampoo was first applied to ensure that the hair was clean. Then the hair was wound on rods and a reducing 20 composition was applied. This composition contained 10 % by weight of thioglycollic acid in deionised water. Concentrated ammonia solution was added to pH 9.5, and 0.1 % by weight of the disodium salt of ethylenediaminetetra-acetic acid and 1 % by weight of 25 "Triton" X-100 ( Registered Trade Mark ) were included, together with perfume.

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After an appropriate time, usually 20 to 25 minutes, depending on the subject, the hair was rinsed with warm water. An aqueous keratin hydrolysate containing 20 % by weight of solids and at pH 6.5 was 5 applied to the hair. Then after 1 minute a neutralising composition containing 10 % by weight of sodium bromate, 5 % by weight of sodium lauryl ether sulphate, 1 % by weight of coconut diethanolamide and perfume in deionised water and at pH 6.8 was 10 applied. The hair was then rinsed with water and the rods were removed.

The results were good with subjects having hair in good condition or hair that had previously been chemically treated, permanent waved, bleached or 15 coloured. The feel and condition of the hair were greatly enhanced, and the waves remained in the hair after a number of subsequent shampoo treatments

Example 2

In the procedure of Example 1 the aqueous protein 20 hydrolysate contained 5 % by weight of "Merquat"-100. The subjects had an excellent hair wave, and it was stable for 8 to 12 weeks, although subsequent shampoo treatments were applied. The hair had a good feel and condition, and so other conditioning 25 treatments were not required over the whole period.

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Example 3

- A reducing composition was prepared to contain by weight 11% of ammonium thioglycollate, 1% of non-ionic surfactant, 0.2% of perfume, 0.2% of 5 disodium ethylenediaminetetra-acetate, 0.5% of opaquing agent, aqueous ammonia solution to pH 9.3 and deionised water to 100%. The solution was applied to the skin of a test subject. After 15 minutes the skin was rinsed lightly with water 10 and then an aqueous keratin hydrolysate containing 15% of solids was applied to the skin. After 1 minute a neutraliser composition was applied. This composition contained by weight 2% of hydrogen peroxide, 3% of triethanolamine sulphate, 1.5% 15 of coconut diethanolamide, 0.3% of perfume, 1% of ethoxylated lanoline derivative, 0.05% of phenacetin and deionised water to 100%. After 5 minutes the skin was rinsed and dried. It had a greatly improved feel.
- 20 A similar effect was achieved when the nails on one hand of a test subject were treated in this way, by comparison with the nails on the untreated hand.

Example 4

- A neutraliser composition of the type described in 25 Example 1, an aqueous keratin hydrolysate and a

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reducing composition of the type described in Example 3 were placed in a packaging container to give a permanent waving kit for home or professional use.

Example 5

5 A reducing composition containing sodium sulphite instead of ammonium thioglycollate was prepared. It was applied to the hair of test subjects whose hair had been given a shampoo and wound on rods. After 25 minutes the hair was rinsed and an aqueous protein hydrolysate  
10 (molecular weight about 90,000 daltons) was applied. Then after about 1 minute a neutralising composition containing hydrogen peroxide was applied. The properties of the treated hair were greatly improved in comparison with those of hair either not  
15 treated with the protein hydrolysate or treated with it at a different stage of the procedure.

Example 6

The procedure of Example 5 was repeated, except that a protein hydrolysate of molecular weight of about  
20 150,000 daltons was used. Again the treated hair had improved and desirable properties.

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CLAIMS

- 1 A process for improving the condition of the hair, skin or nails, characterised by contact of that part of the body with a reducing composition, rinsing of the treated part, contact of the rinsed part with an aqueous protein hydrolysate and then contact with a neutralising composition.
- 2 A process as claimed in claim 1, further characterised by using an aqueous protein hydrolysate obtained from a protein having a large number of disulphide linkages.
- 3 A process as claimed in claim 2, further characterised by using a hydrolysate obtained from a protein containing at least 1% of cysteine.
- 4 A process as claimed in claim 1, further characterised by using an aqueous protein hydrolysate obtained by treating keratin with aqueous sodium hydroxide under mild conditions.
- 5 A process as claimed in claim 1, further characterised by using an aqueous protein hydrolysate

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in which the hydrolysed protein has an average molecular weight of 2,000 to 200,000 daltons.

6 A process as claimed in claim 5, further characterised by using a hydrolysed protein of molecular weight of over 50,000 daltons.

7 A process as claimed in claim 1, further characterised by using an aqueous protein hydrolysate at pH 5 to 8.

8 A process as claimed in claim 1, further characterised by using an aqueous protein hydrolysate containing a cationic polymer.

9 A process as claimed in claim 1, further characterised by using a reducing composition containing thioglycollic acid or thiolactic acid or their salts, or an alkali metal or ammonium sulphite or bisulphite, or thioglycerol.

10 A process as claimed in claim 9, further characterised by using a reducing composition containing thioglycollic acid at 2 to 20% by weight.

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11 A process as claimed in claim 1, further characterised by using a neutralising composition containing an oxidising agent.

12 A process as claimed in claim 11, in which the oxidising agent is hydrogen peroxide or sodium bromate.

13 A permanent waving kit for use in a process as claimed in claim 1, the kit containing a reducing composition, an aqueous protein hydrolysate and a neutralising composition, each in separate containers.

# INTERNATIONAL SEARCH REPORT

International Application No PCT/GB 85/00248

## I. CLASSIFICATION OF SUBJECT MATTER (if several classification symbols apply, indicate all) \*

According to International Patent Classification (IPC) or to both National Classification and IPC

**IPC<sup>4</sup>:** A 61 K 7/09; A 61 K 7/06; A 61 K 7/48; A 61 K 7/04

## II. FIELDS SEARCHED

		Minimum Documentation Searched †
Classification System :		Classification Symbols
IPC	4	A 61 K
Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in the Fields Searched §		

## III. DOCUMENTS CONSIDERED TO BE RELEVANT \*

Category *	Citation of Document, ** with indication, where appropriate, of the relevant passages ††	Relevant to Claim No. ††
X, YFR, A,	2511232 (BRISTOL-MYERS) 18 February 1983, see page 2, lines 8-20; page 4, lines 17-38; page 7, line 35 - page 10, line 40, see page 12, lines 9-17; claims; examples	1-13
Y FR, A,	2060406 (GENERAL CHEMICALS AND COSMETICS LTD) 18 June 1971, see page 1, lines 1-6; page 2, lines 1-4; page 9, lines 3-7; claims	1-8
Y US, A,	2540494 (M.H. SCHWARZ) 6 February 1951, see column 1, lines 39-59; column 2, line 44 - column 3, line 9; column 3, lines 18-28; column 8, lines 1-13; claims	1,9-12
P, X US, A,	4494557 (G.D. NAGEL) 22 January 1985, see column 2, lines 6-66; column 4, lines 16-20; claims	1-13

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## IV. CERTIFICATION

Date of the Actual Completion of the International Search

17th September 1985

Date of Mailing of this International Search Report

28 OCT. 1985

International Searching Authority

EUROPEAN PATENT OFFICE

Signature of Authorized Officer

G.L.M. Kuydenberg

ANNEX TO THE INTERNATIONAL SEARCH REPORT ON

INTERNATIONAL APPLICATION NO.

PCT/GB 85/00248 (SA 9842)

This Annex lists the patent family members relating to the patent documents cited in the above-mentioned international search report. The members are as contained in the European Patent Office EDP file on 18/10/85

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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
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US-A- 2540494		None	
US-A- 4494557	22/01/85	None	